

CLAIMS

1. An adjustable joint unit including:

a ball stud having a stud portion that is provided at one end thereof with a ball head portion;

a bearing seat which serves to contain said ball head portion in such a manner as to permit the ball head portion to slide therein and has an insertion hole through which said stud portion is adapted to be inserted;

a generally plate-shaped arm having a generally cylindrical socket portion which serves to contain said bearing seat and is formed by a pressing process so as to have an axis extending in the same direction as the thickness of the arm and be open at both ends, with an aperture portion that permits said stud portion to be inserted therethrough being formed at the protruding end, i.e. the end facing the direction in which the socket portion protrudes, and a mounting opening portion at the base end of the socket portion; and

a closing member which is adapted to be attached in such a manner as to close off the mounting opening portion at the base end of the socket portion and apply a given preliminary load to the ball head portion of the ball stud; wherein:

said socket portion of the arm has a crimped portion provided along the inner rim of said mounting opening portion and adapted to receive and hold the outer rim of said closing member, said crimped portion formed by crimping into a

~~flange-like shape that extends inward and formed in steps having different thicknesses, with the inner step thinner than the outer step.~~

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2. An adjustable joint unit as claimed in claim 1, wherein the crimped portion has a first step portion, which is formed along the inner rim of the mounting opening portion of the socket portion by crimping so as to extend inward in a flange-like shape, and a second step portion which is formed along the edge of the first step portion by crimping so as to extend inward in flange-like shape.

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3. An adjustable joint unit as claimed in claim 1 or claim 2, wherein the crimped portion is formed by a crimping process, which is conducted by rolling rotatable rollers along the inner rim of the mounting opening portion of the socket portion.

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4. A method of producing an adjustable joint unit comprising steps of:

forming an arm by pressing a generally plate-shaped arm base member so as to form a generally cylindrical socket portion having an axis extending in the same direction as the thickness of the arm and open at both ends, with an aperture portion at the protruding end and a mounting opening portion at the base end of the socket portion;

inserting a ball head portion of a ball stud from said mounting opening portion into the socket portion of the arm so that the ball head portion is contained in the socket portion,

with a bearing seat between the ball head portion and the socket portion;

fitting a closing member in said mounting opening portion of the socket portion so as to close off mounting opening portion; and

forming a crimped portion adapted to receive and hold the outer rim of said closing member by crimping the inner rim of said mounting opening portion so that the crimped portion extends inward in a flange-like shape consisting of steps having different thicknesses, with the inner step thinner than the outer step.

5. A method of producing an adjustable joint unit as claimed in claim 4, wherein the crimping portion is formed by forming a first step portion, which extends inward like a flange, along the inner rim of the mounting opening portion of the socket portion, and then crimping the edge of the first step portion so as to form a second step portion extending inward like a flange so that the crimped portion consists of steps having different thicknesses, with the inner step thinner than the outer step.

6. A method of producing an adjustable joint unit as claimed in claim 4 or claim 5, wherein the crimping portion is formed by a crimping process, which calls for rolling rotatable rollers along the inner rim of the mounting opening portion of the socket portion.

Add C4

Add
B1

JULY

SUMMARY

An arm base member made of a steel plate is pressed with the pressure being applied in the same direction of the thickness of the arm base member so as to form a socket portion (7) that protrudes in a generally cylindrical shape and open at both ends, in other words a socket portion (7) provided with an aperture portion (5) having a gradually decreasing diameter at the protruding end and a mounting opening portion (6) at the base end. The socket portion (7) is placed and secured in a support stand (60) of a crimping machine (50), and a ball stud (21) is attached to the socket portion (7) in the state where a ball head portion (24) is contained in the socket portion (7). A closing plate (11) is fitted in the mounting opening portion (6), and rollers (58) are rolled along the inner rim of the socket portion (7), thereby crimping the inner rim to form a first step portion (13a) that extends inward in a flange-like shape. Rollers (59) are rolled along the edge of the first step portion (13a), thereby crimping the end portion of the first step portion (13a) so as to form a second step portion (13b) that extends inward in a flange-like shape. Thus, a crimped portion (13), of which the portion near the inner end is thinner than the portion near the base end because of a step-like structure, is formed. Because of the increased contact surface between the closing

plate (11) and the crimped portion(13), the closing plate (11) can be attached reliably and securely, with the improved sealing ability.